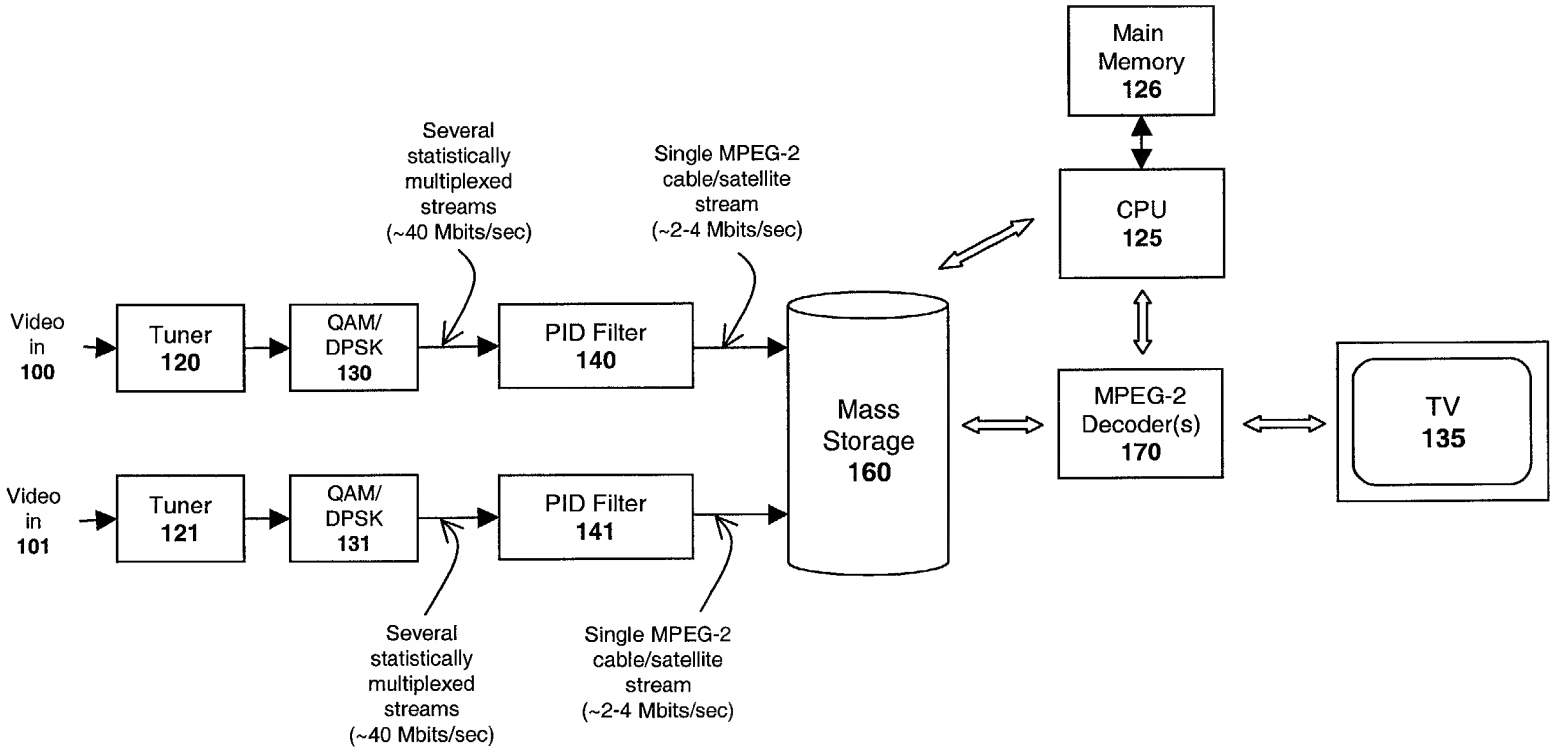

FIG. 1

(prior art)

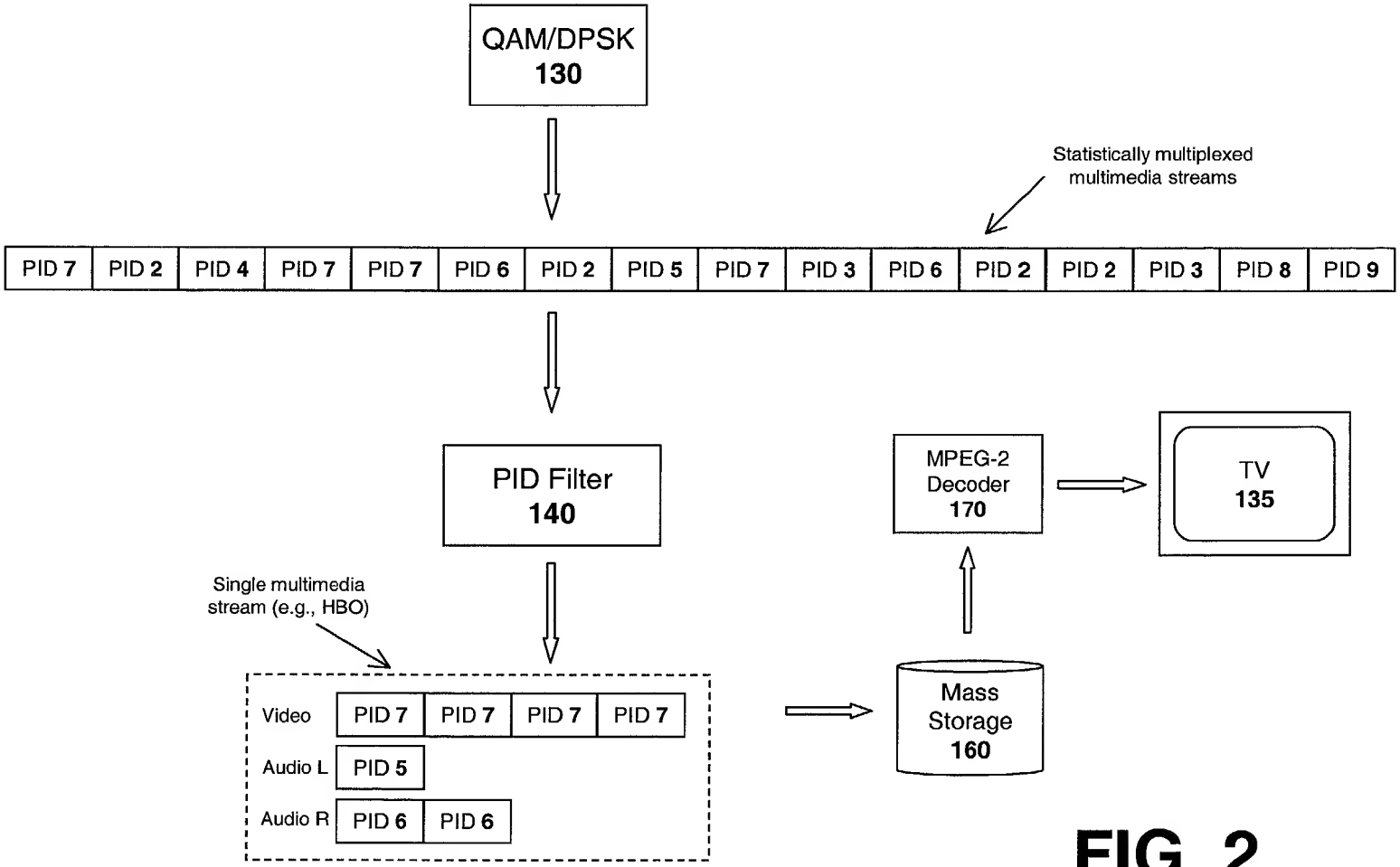

FIG. 2
(prior art)

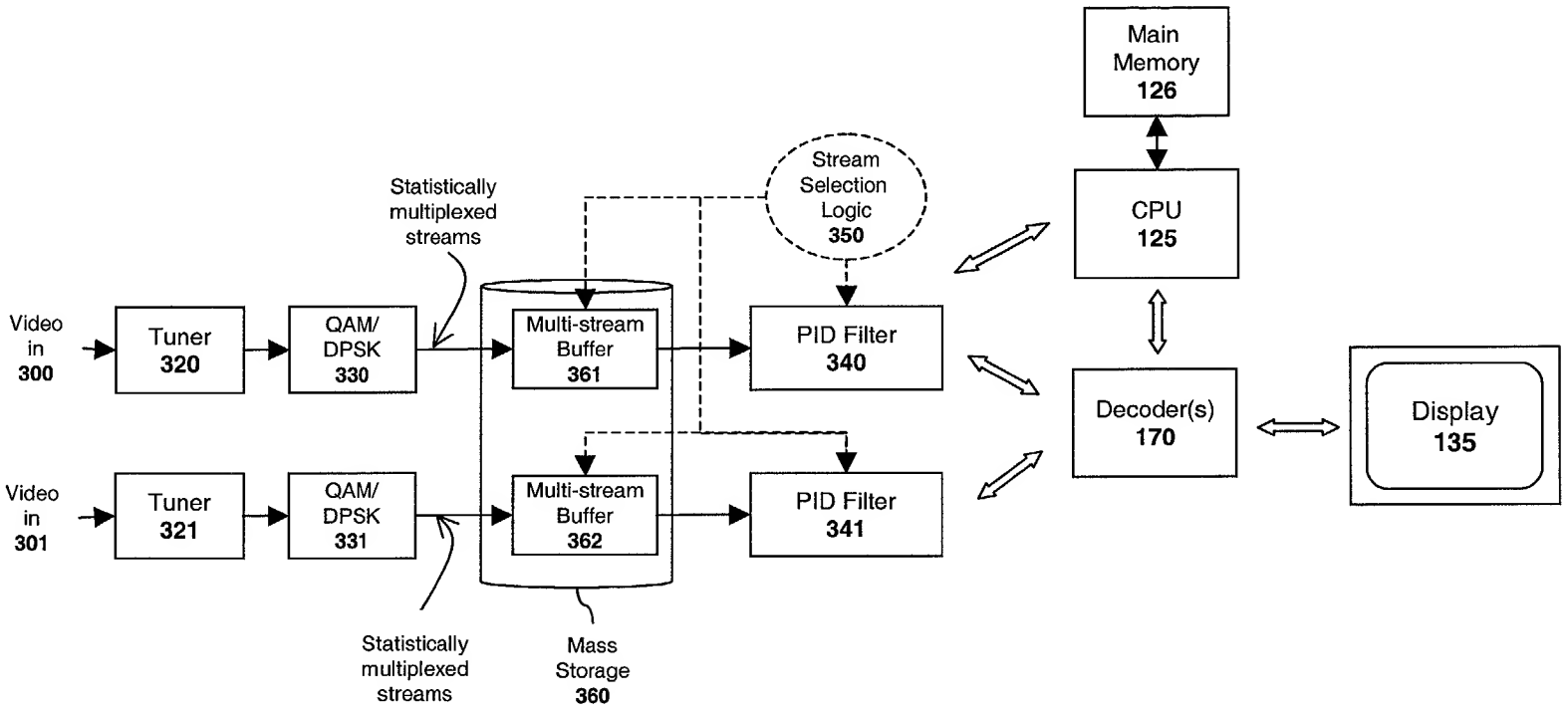
Main Memory 126
CPU 125
Stream Selection Logic 350
Statistically multiplexed streams
Video in 300
Tuner 320
QAM/ DPSK 330
Multi-stream Buffer 361
PID Filter 340
Decoder(s) 170
Display 135
Video in 301
Tuner 321
QAM/ DPSK 331
Multi-stream Buffer 362
PID Filter 341
Statistically multiplexed streams
Mass Storage 360

FIG. 3

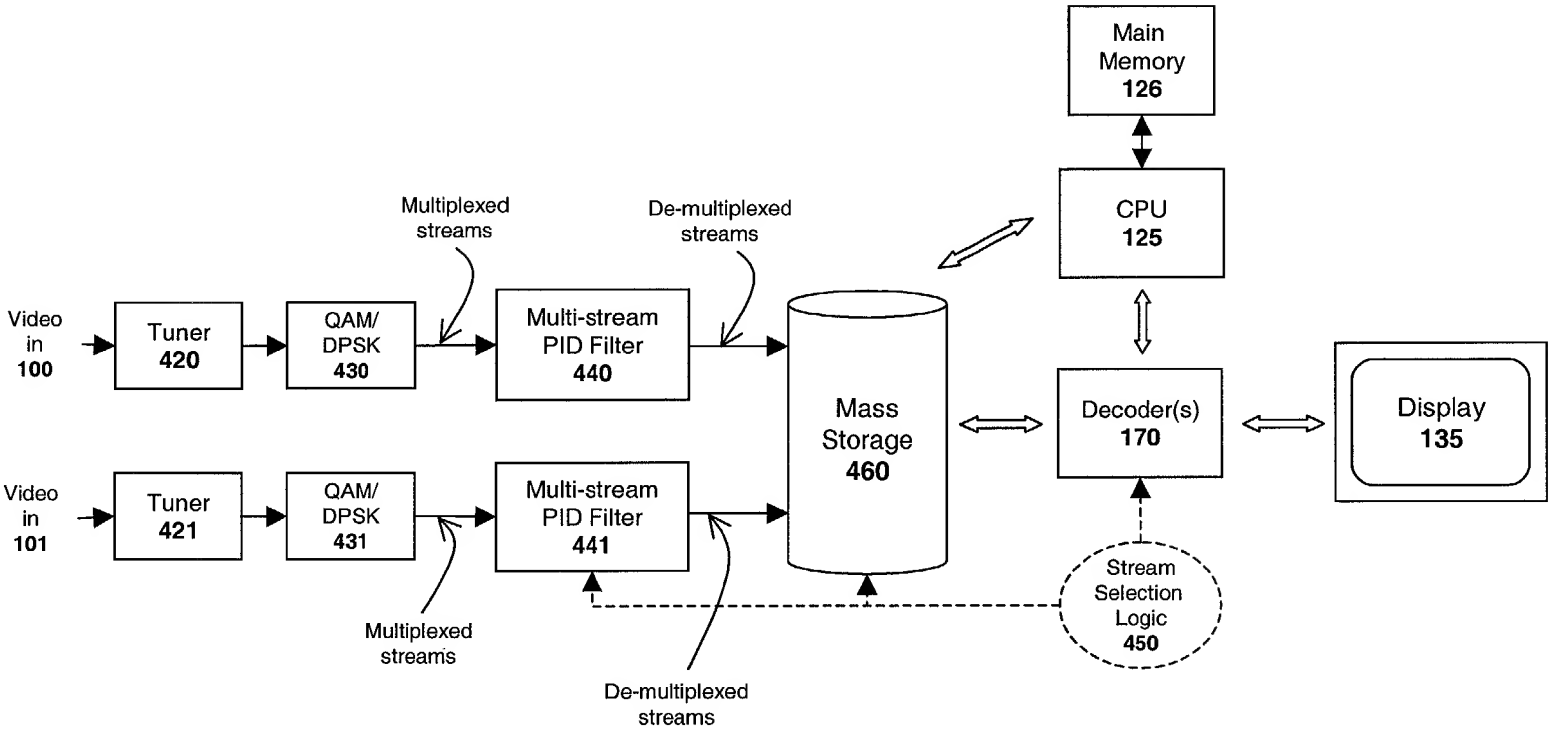
Main Memory 126
CPU 125
Multiplexed streams
De-multiplexed streams
Video in 100
Tuner 420
QAM/ DPSK 430
Multi-stream PID Filter 440
Mass Storage 460
Decoder(s) 170
Display 135
Video in 101
Tuner 421
QAM/ DPSK 431
Multi-stream PID Filter 441
Stream Selection Logic 450
Multiplexed streams
De-multiplexed streams

FIG. 4

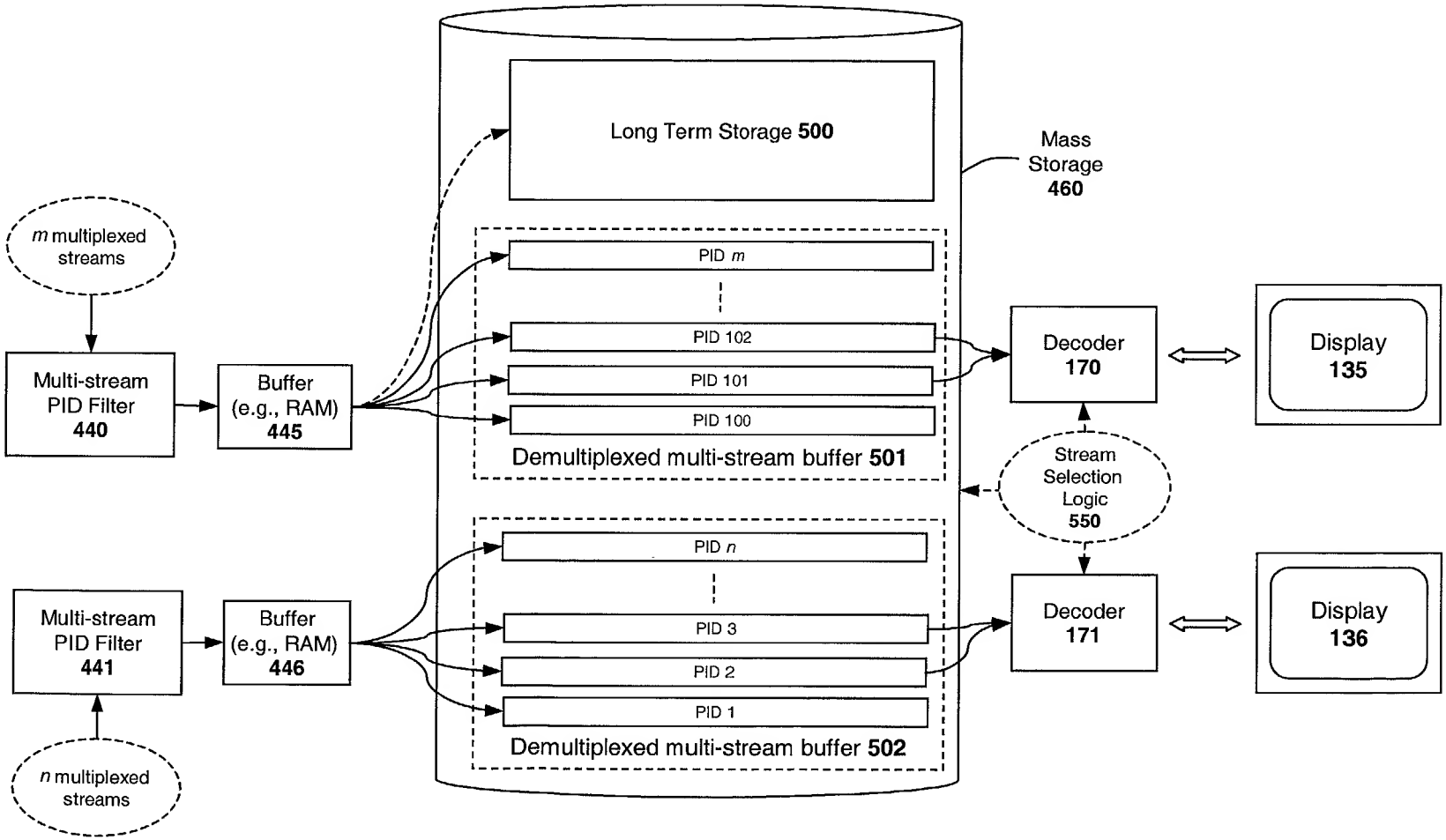
Long Term Storage 500
Mass Storage 460
m multiplexed streams
Multi-stream PID Filter 440
Buffer (e.g., RAM) 445
PID m
PID 102
PID 101
PID 100
Demultiplexed multi-stream buffer 501
Decoder 170
Display 135
Stream Selection Logic 550
PID n
PID 3
PID 2
PID 1
Demultiplexed multi-stream buffer 502
Multi-stream PID Filter 441
Buffer (e.g., RAM) 446
n multiplexed streams
Decoder 171
Display 136

FIG. 5

Program Guide **600**

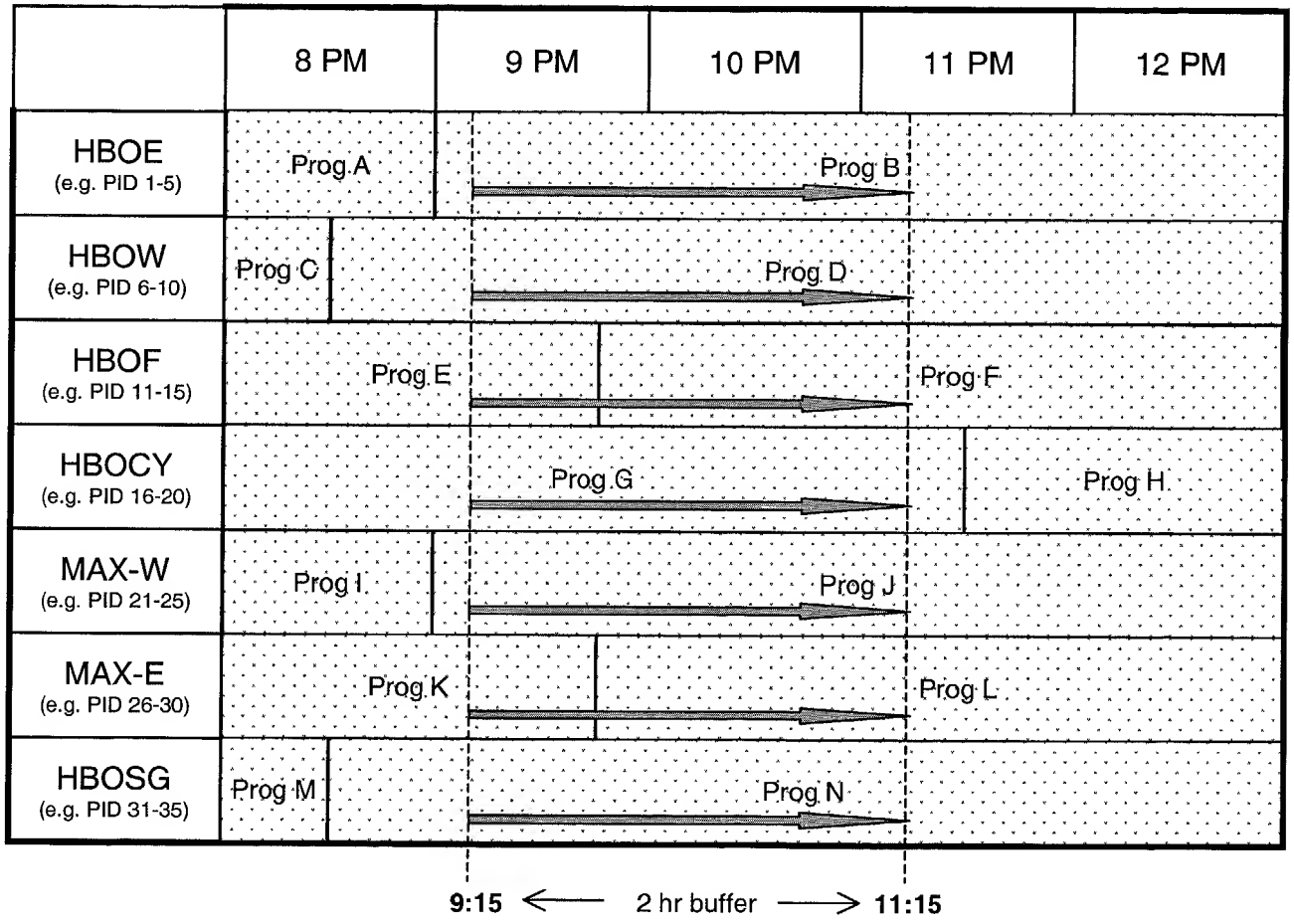

FIG. 6

Program Guide **500**

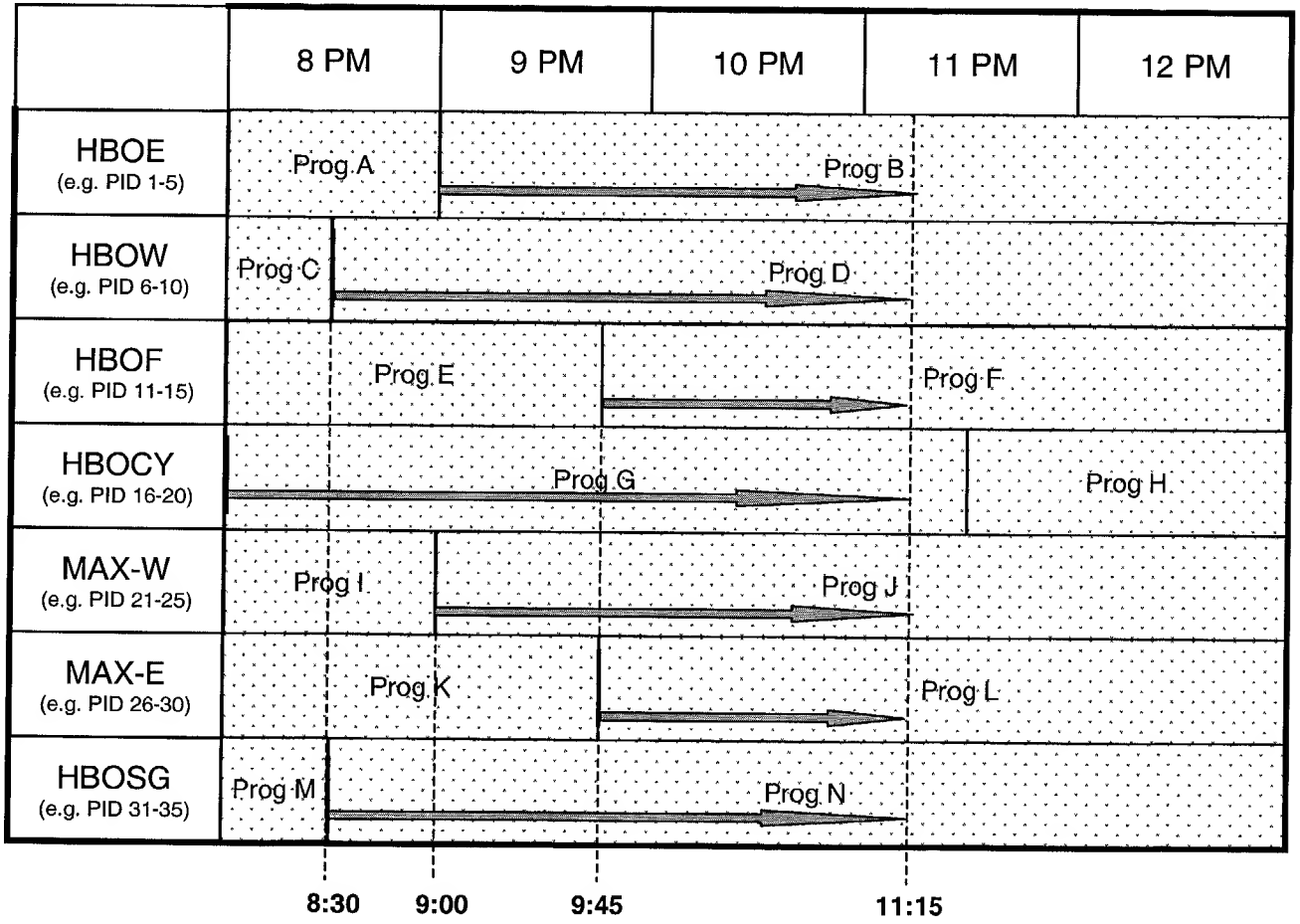

FIG. 7

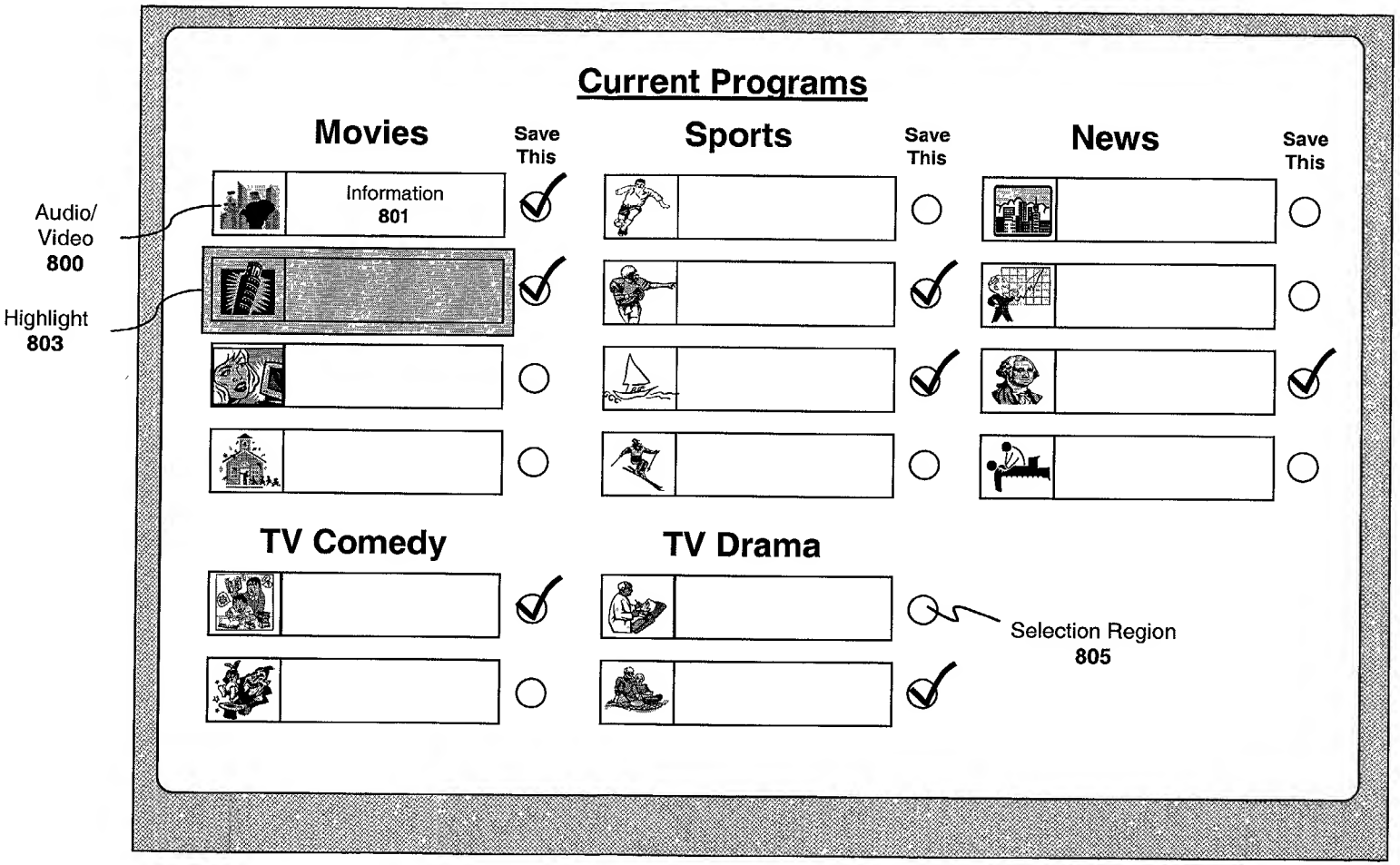
Current Programs
Movies
Save This
Sports
Save This
News
Save This
Information
801
Audio/
Video
800
Highlight
803
TV Comedy
TV Drama
Selection Region
805

FIG. 8

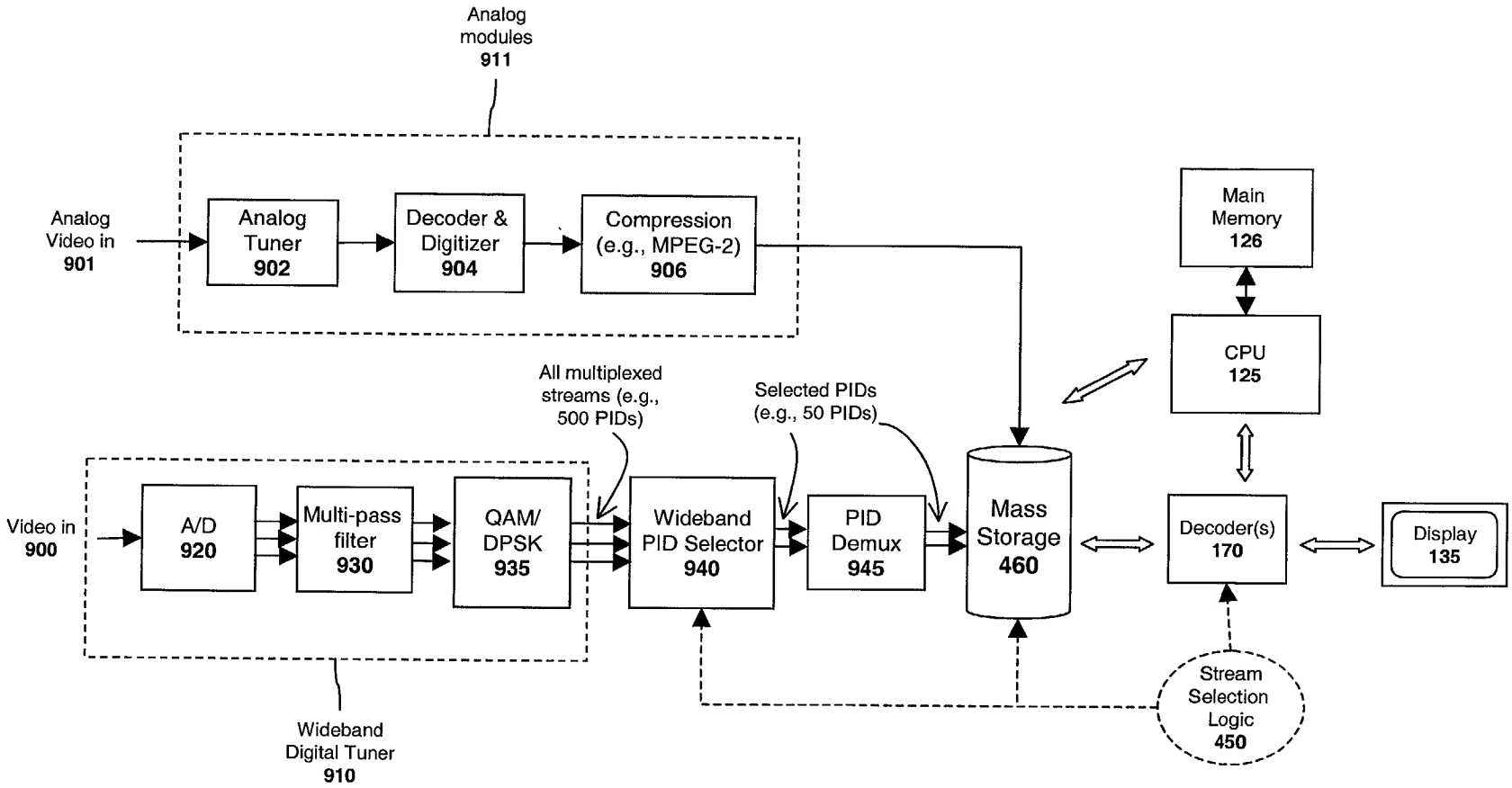
Analog modules 911
Analog Video in 901
Analog Tuner 902
Decoder & Digitizer 904
Compression (e.g., MPEG-2) 906
Main Memory 126
CPU 125
All multiplexed streams (e.g., 500 PIDs)
Selected PIDs (e.g., 50 PIDs)
Video in 900
A/D 920
Multi-pass filter 930
QAM/ DPSK 935
Wideband PID Selector 940
PID Demux 945
Mass Storage 460
Decoder(s) 170
Display 135
Stream Selection Logic 450
Wideband Digital Tuner 910

FIG. 9

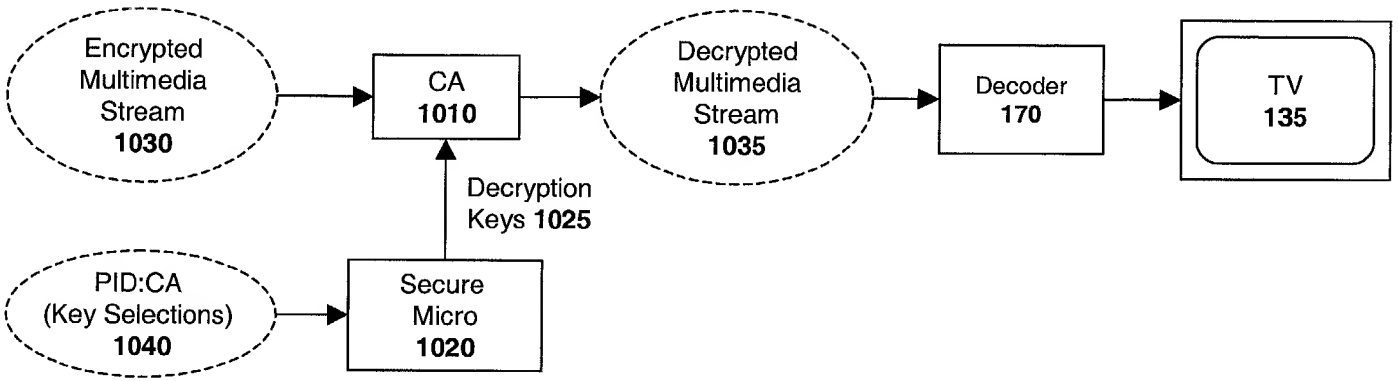
Encrypted
Multimedia
Stream
1030
CA
1010
Decrypted
Multimedia
Stream
1035
Decoder
170
TV
135
Decryption
Keys 1025
PID:CA
(Key Selections)
1040
Secure
Micro
1020

FIG. 10

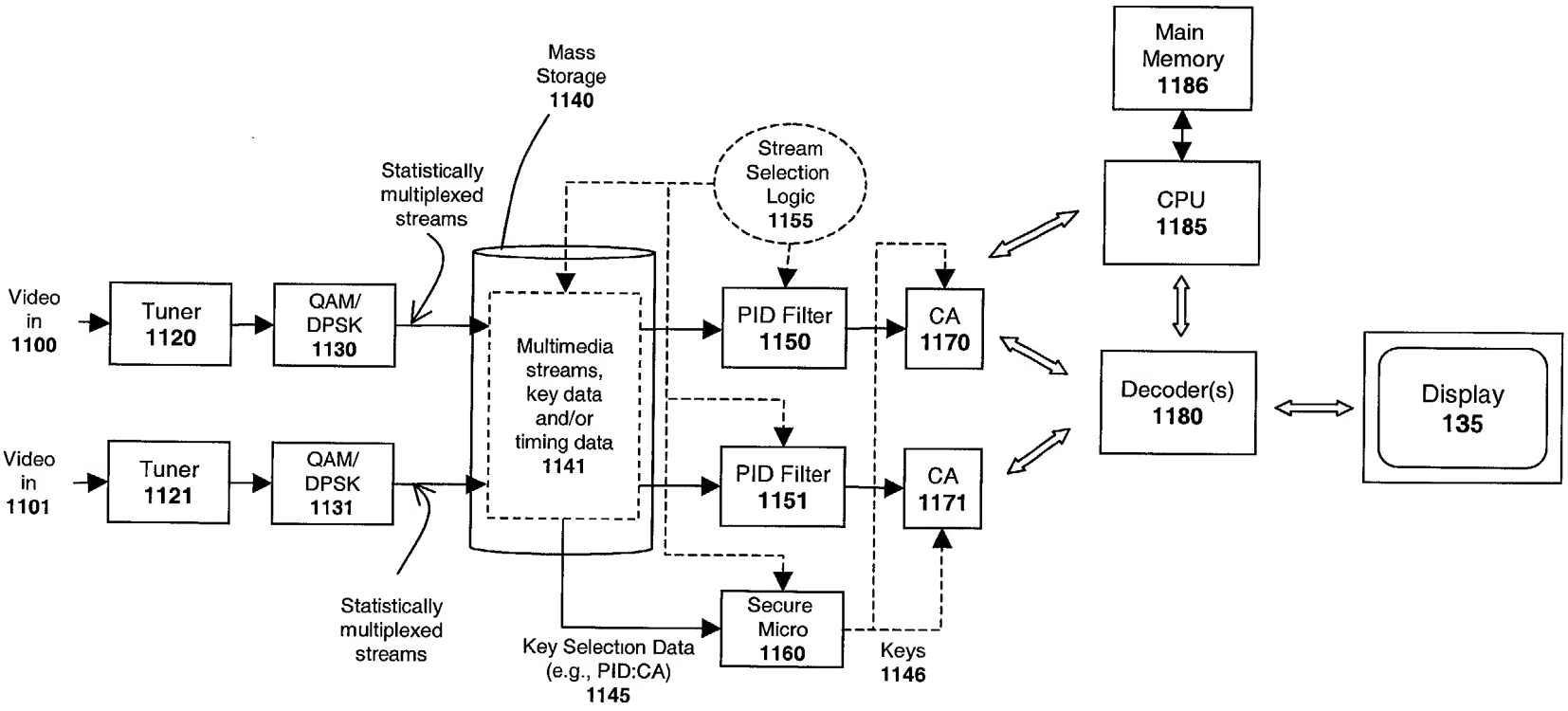
Mass Storage 1140
Statistically multiplexed streams
Stream Selection Logic 1155
Main Memory 1186
CPU 1185
Video in 1100
Tuner 1120
QAM/ DPSK 1130
Multimedia streams, key data and/or timing data 1141
PID Filter 1150
CA 1170
Decoder(s) 1180
Display 135
Video in 1101
Tuner 1121
QAM/ DPSK 1131
PID Filter 1151
CA 1171
Statistically multiplexed streams
Secure Micro 1160
Key Selection Data (e.g., PID:CA) 1145
Keys 1146

FIG. 11

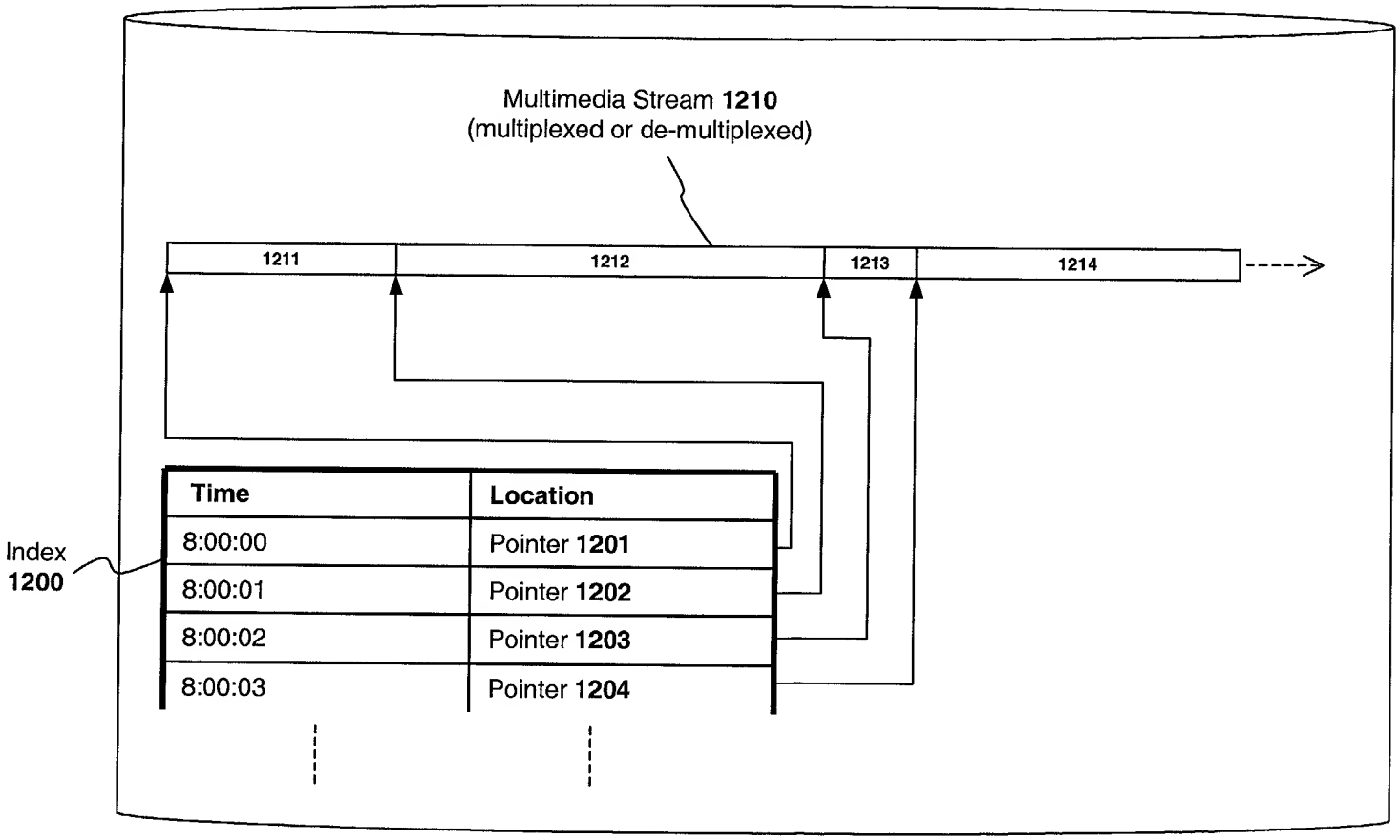
Multimedia Stream 1210
(multiplexed or de-multiplexed)
1211
1212
1213
1214
Index
1200
Time
Location
8:00:00
Pointer 1201
8:00:01
Pointer 1202
8:00:02
Pointer 1203
8:00:03
Pointer 1204

FIG. 12

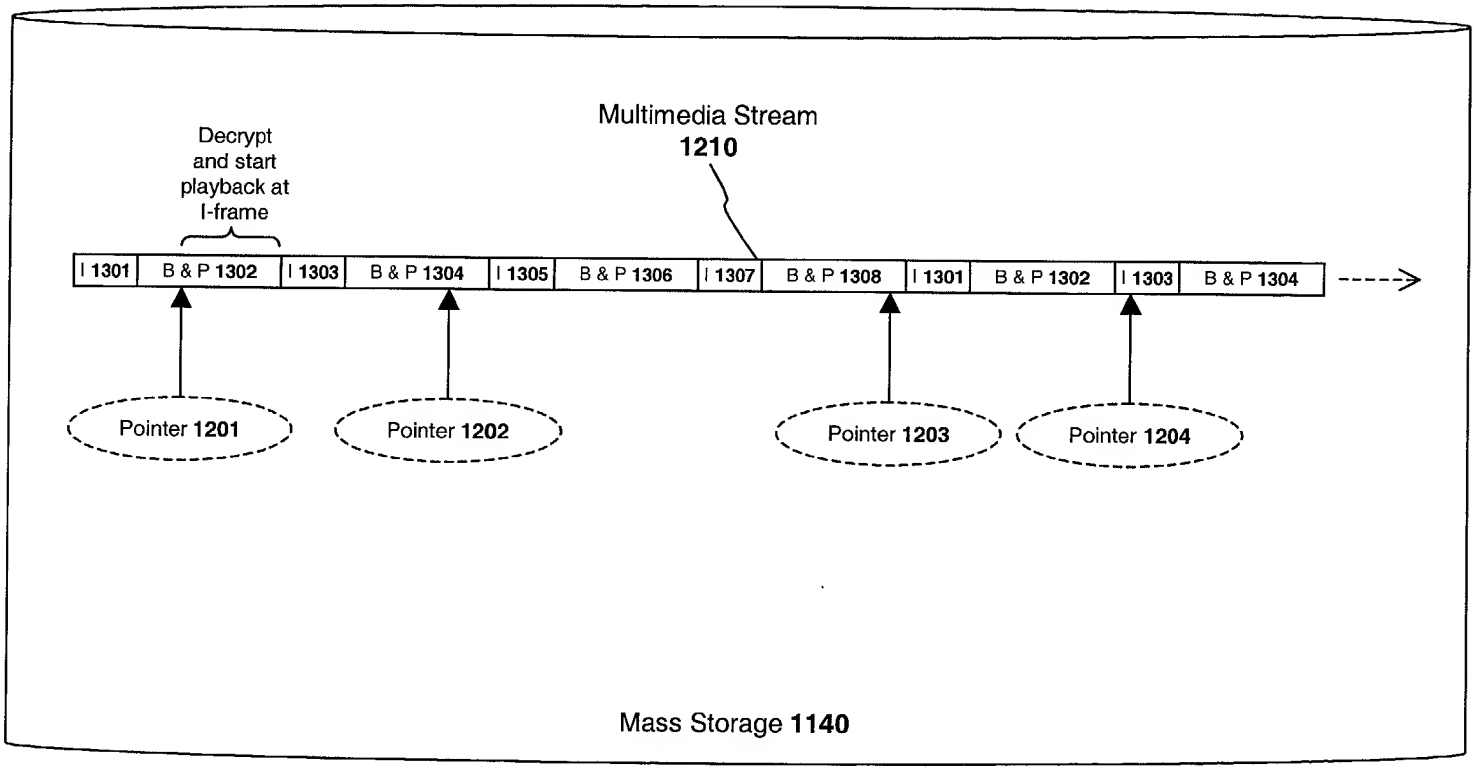
Multimedia Stream
1210
Decrypt
and start
playback at
I-frame
I 1301
B & P 1302
I 1303
B & P 1304
I 1305
B & P 1306
I 1307
B & P 1308
I 1301
B & P 1302
I 1303
B & P 1304
Pointer 1201
Pointer 1202
Pointer 1203
Pointer 1204
Mass Storage 1140

FIG. 13

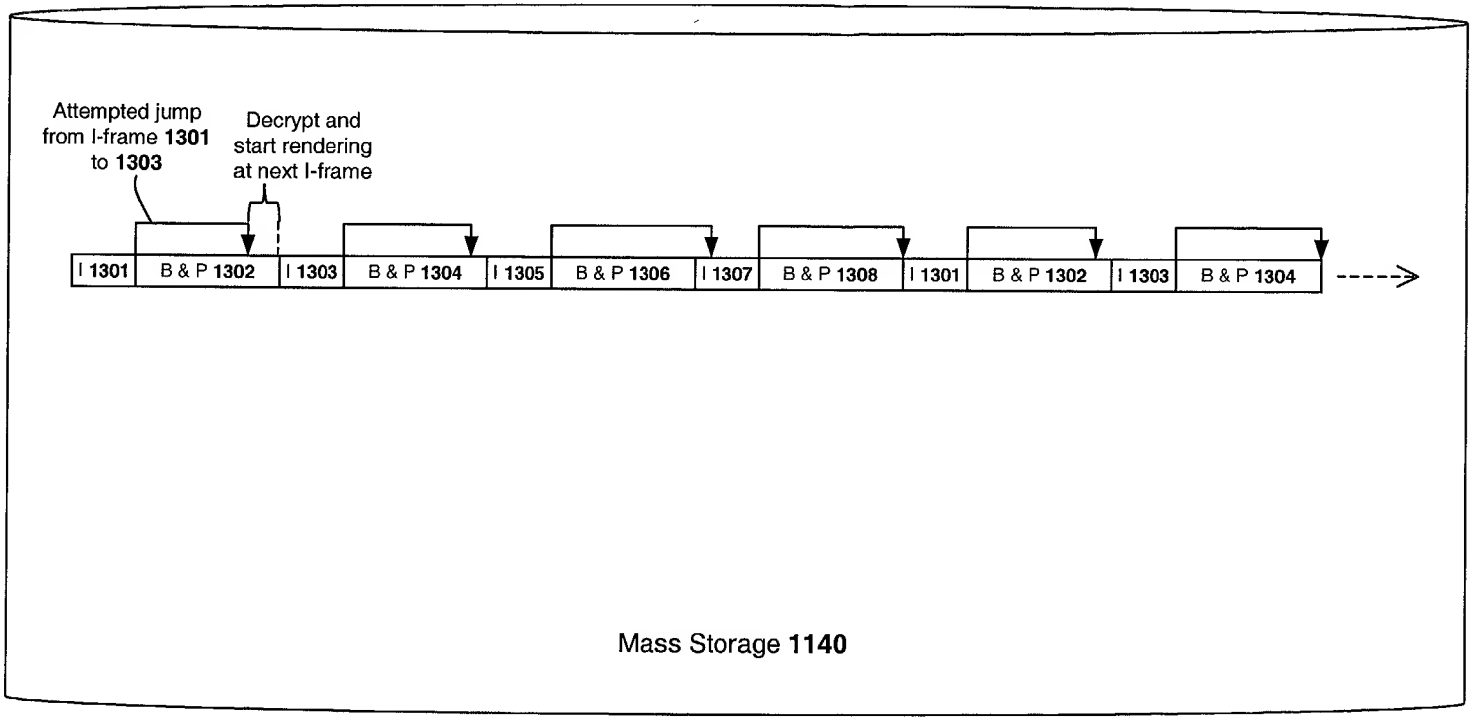
Attempted jump from I-frame 1301 to 1303
Decrypt and start rendering at next I-frame
I 1301
B & P 1302
I 1303
B & P 1304
I 1305
B & P 1306
I 1307
B & P 1308
I 1301
B & P 1302
I 1303
B & P 1304
Mass Storage 1140

FIG. 14

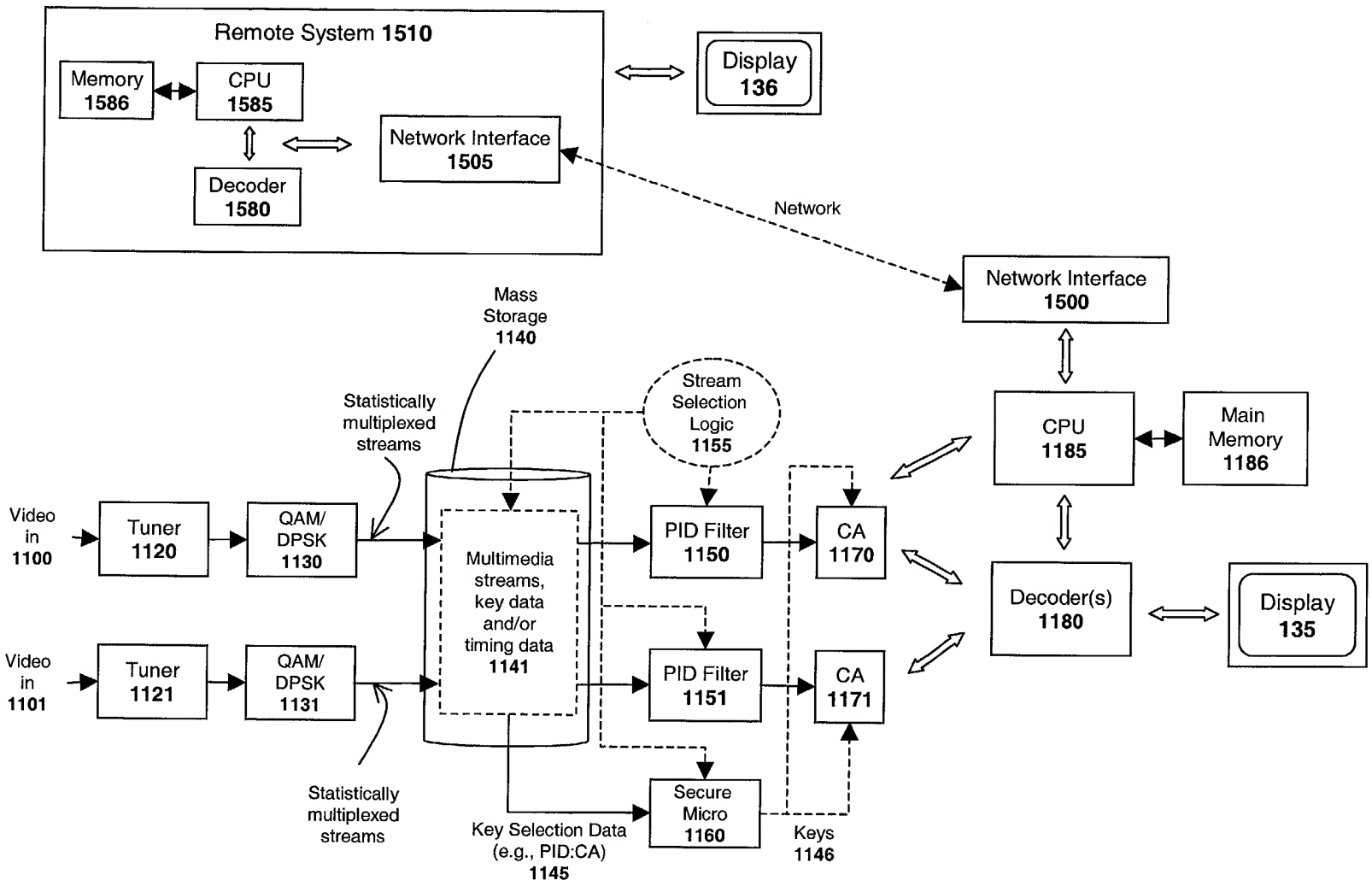
Remote System 1510
Memory 1586
CPU 1585
Network Interface 1505
Decoder 1580
Display 136
Network
Network Interface 1500
Mass Storage 1140
Statistically multiplexed streams
Stream Selection Logic 1155
CPU 1185
Main Memory 1186
Video in 1100
Tuner 1120
QAM/ DPSK 1130
Multimedia streams, key data and/or timing data 1141
PID Filter 1150
CA 1170
Decoder(s) 1180
Display 135
Video in 1101
Tuner 1121
QAM/ DPSK 1131
PID Filter 1151
CA 1171
Statistically multiplexed streams
Secure Micro 1160
Key Selection Data (e.g., PID:CA) 1145
Keys 1146

FIG. 15

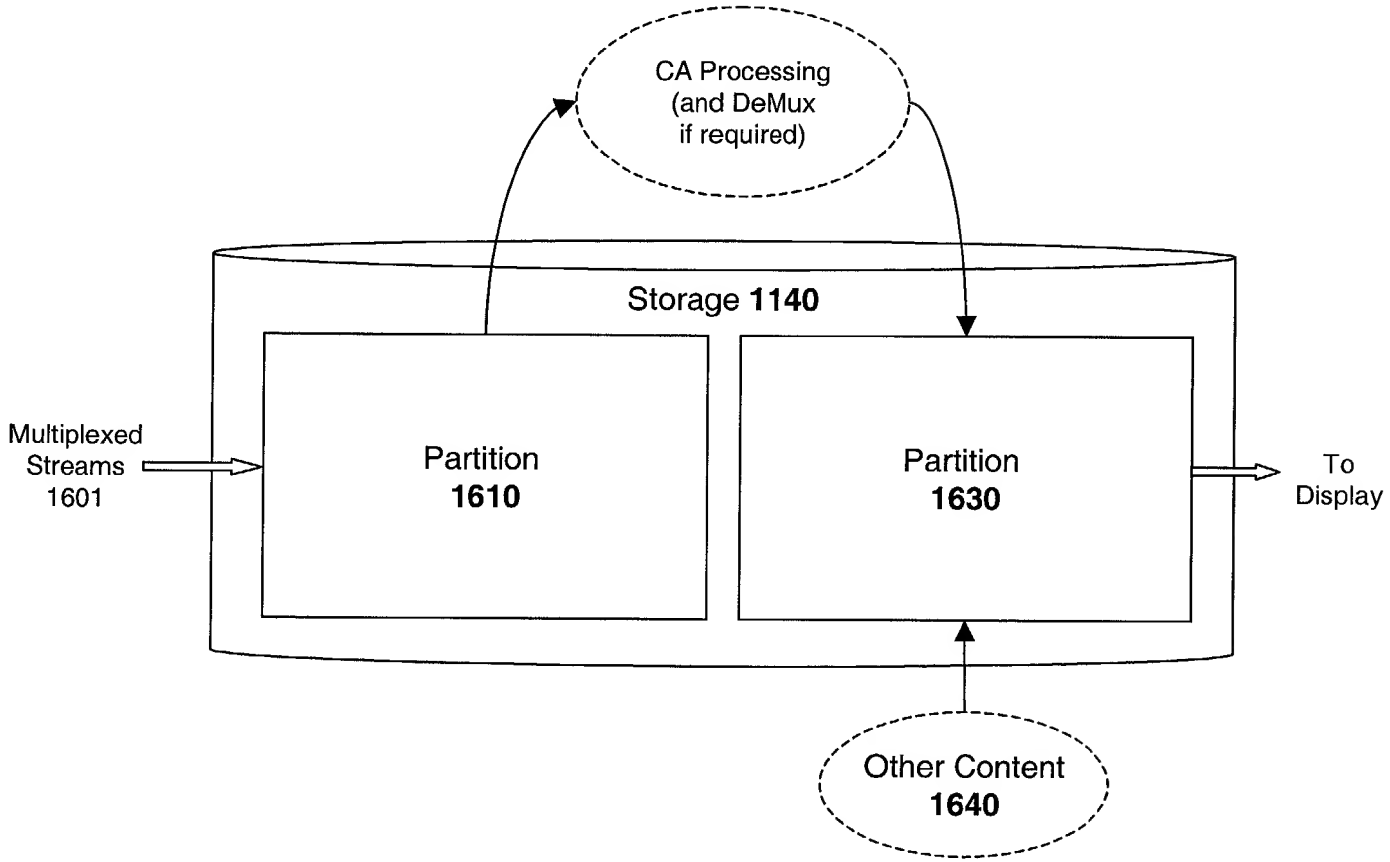
CA Processing
(and DeMux
if required)
Storage 1140
Multiplexed
Streams
1601
Partition
1610
Partition
1630
To
Display
Other Content
1640

FIG. 16

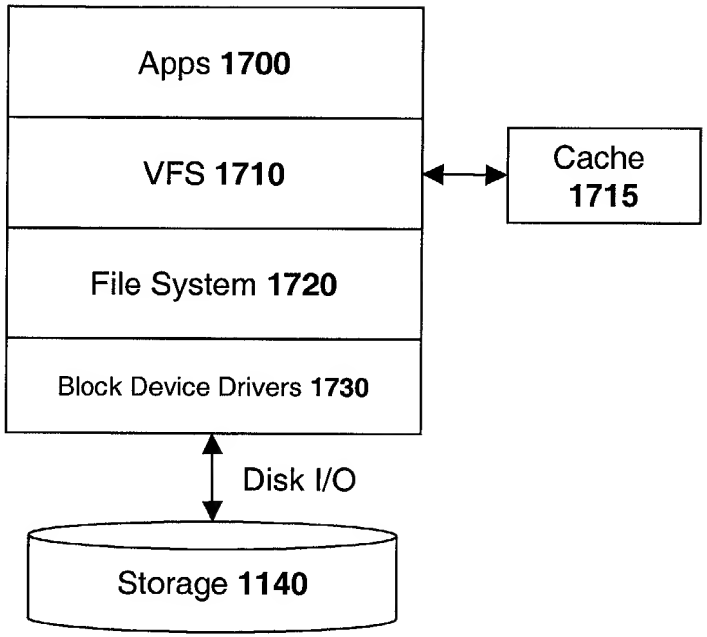
Apps 1700
VFS 1710
Cache 1715
File System 1720
Block Device Drivers 1730
Disk I/O
Storage 1140

FIG. 17

Head Seek Pattern Optimized for Reading

File A ⇒	Block 1800 (file A)	Block 1801 (file A)	Block 1802 (file A)	Block 1803 (file A)	Block 1804 (file A)	---->
File B ⇒	Block 1810 (file B)	Block 1811 (file B)	Block 1812 (file B)	Block 1813 (file B)	Block 1814 (file B)	---->
File C ⇒	Block 1820 (file C)	Block 1821 (file C)	Block 1822 (file C)	Block 1823 (file C)	Block 1824 (file C)	---->
File D ⇒	Block 1830 (file D)	Block 1831 (file D)	Block 1832 (file D)	Block 1833 (file D)	Block 1834 (file D)	---->

FIG. 18a

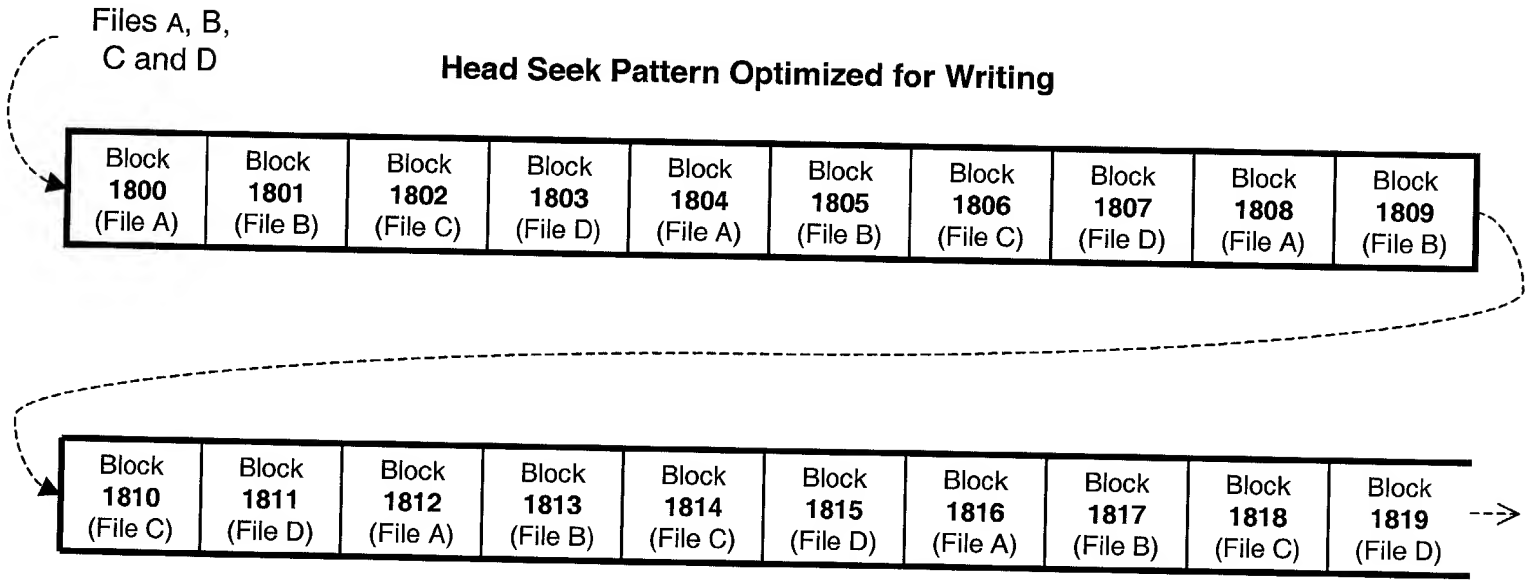
Files A, B, C and D
Head Seek Pattern Optimized for Writing
Block 1800 (File A)
Block 1801 (File B)
Block 1802 (File C)
Block 1803 (File D)
Block 1804 (File A)
Block 1805 (File B)
Block 1806 (File C)
Block 1807 (File D)
Block 1808 (File A)
Block 1809 (File B)
Block 1810 (File C)
Block 1811 (File D)
Block 1812 (File A)
Block 1813 (File B)
Block 1814 (File C)
Block 1815 (File D)
Block 1816 (File A)
Block 1817 (File B)
Block 1818 (File C)
Block 1819 (File D)

FIG. 18b

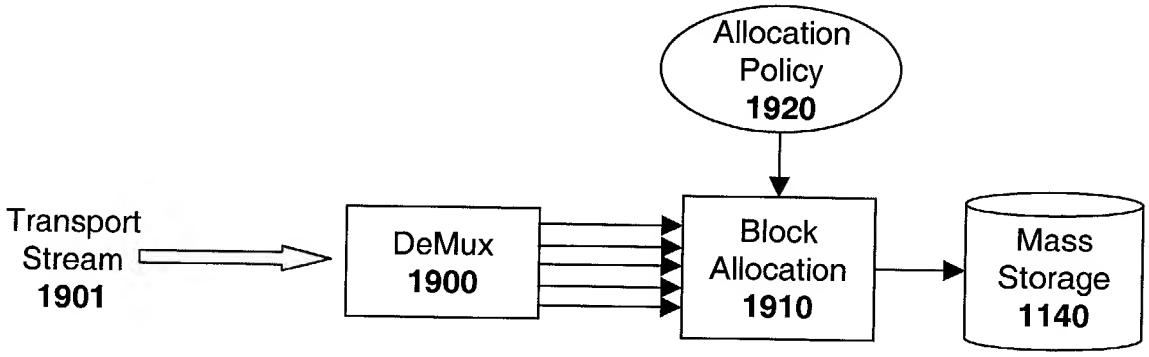
Allocation
Policy
1920
Transport
Stream
1901
DeMux
1900
Block
Allocation
1910
Mass
Storage
1140

FIG. 19

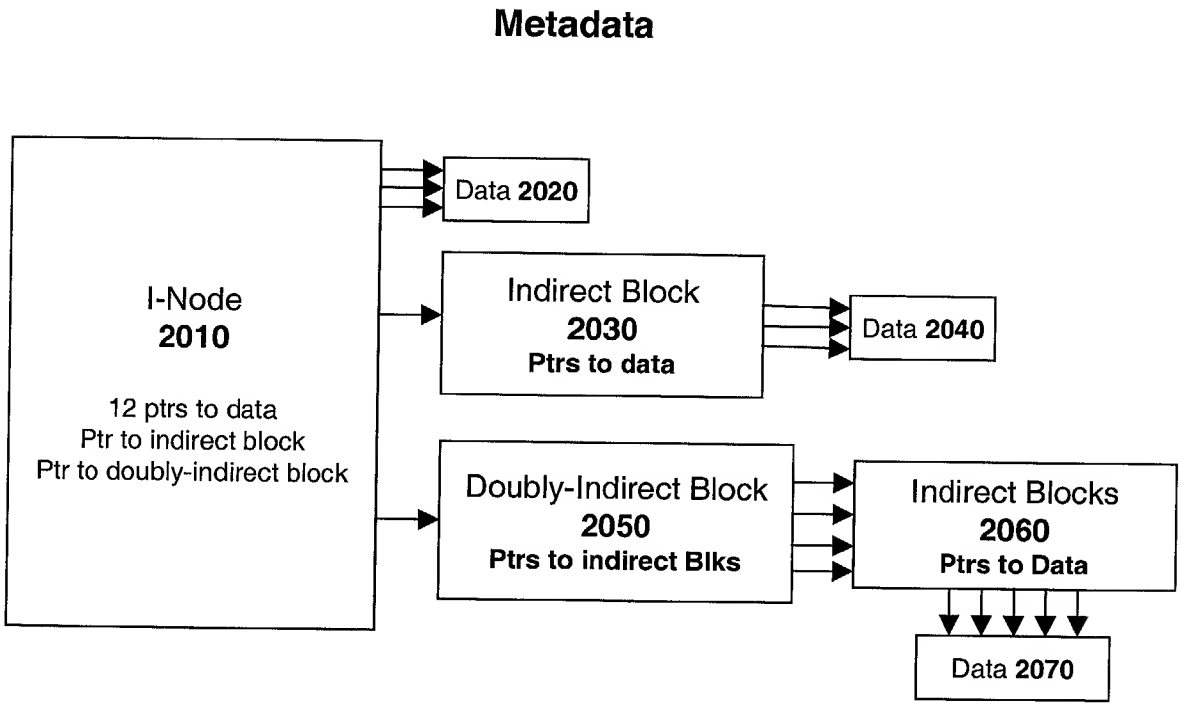
Metadata
I-Node
2010
12 ptrs to data
Ptr to indirect block
Ptr to doubly-indirect block
Data 2020
Indirect Block
2030
Ptrs to data
Data 2040
Doubly-Indirect Block
2050
Ptrs to indirect Blks
Indirect Blocks
2060
Ptrs to Data
Data 2070

FIG. 20

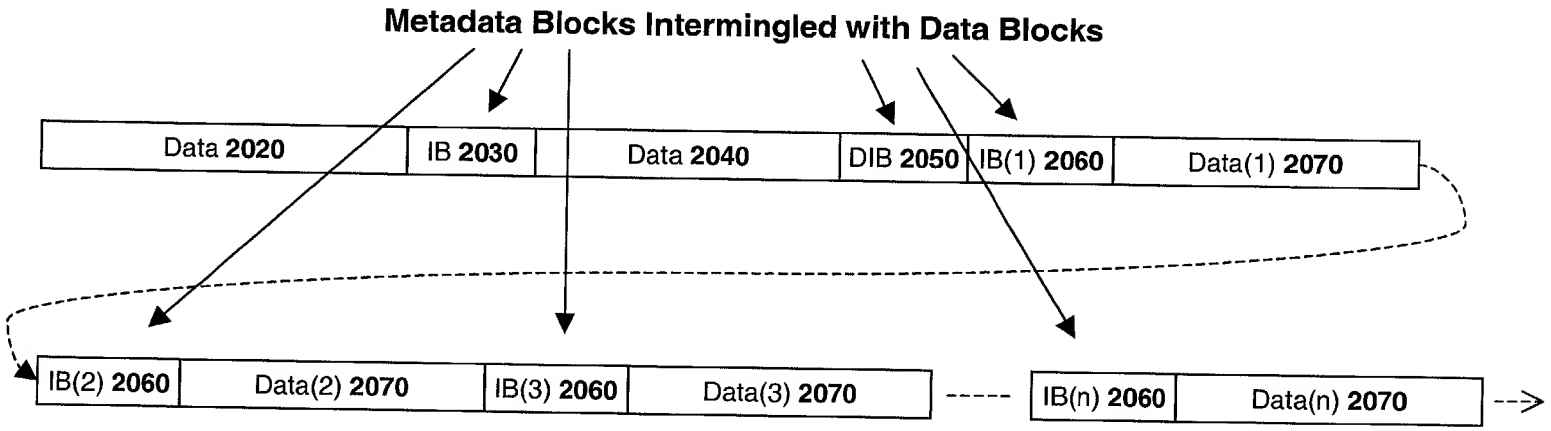
Metadata Blocks Intermingled with Data Blocks
Data 2020
IB 2030
Data 2040
DIB 2050
IB(1) 2060
Data(1) 2070
IB(2) 2060
Data(2) 2070
IB(3) 2060
Data(3) 2070
IB(n) 2060
Data(n) 2070

FIG. 21

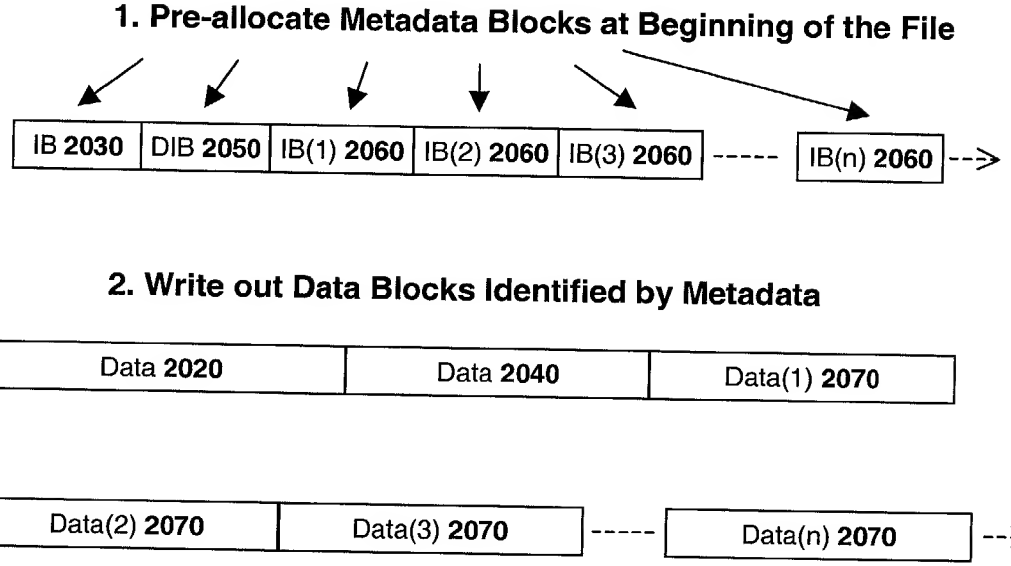
1. Pre-allocate Metadata Blocks at Beginning of the File
IB 2030
DIB 2050
IB(1) 2060
IB(2) 2060
IB(3) 2060
IB(n) 2060
2. Write out Data Blocks Identified by Metadata
Data 2020
Data 2040
Data(1) 2070
Data(2) 2070
Data(3) 2070
Data(n) 2070

FIG. 22